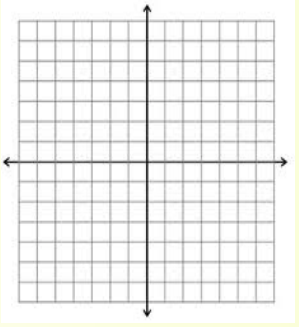
Alg. 2 Warm Up #12-1

1. Solve:

$|x + 1| = 3$

2. Graph:

$y = -x^2 + 4$
$y = x + 2$



Shade the region where

$y < -x^2 + 4$

HW Questions:

Review & Preview

4-51. Gloria is weighing combinations of geometric solids. She found that 4 cylinders and 5 prisms weigh 32 ounces and that 1 cylinder and 8 prisms weigh 35 ounces. Write and solve a system of equations to determine the weight of each cylinder and prism.

$\begin{cases} 4x + 5y = 32 \\ x + 8y = 35 \end{cases}$

let x = weight of cyl.
y = weight of prism

4-52. Is $x = -1$ a solution to the inequality $2x^2 + 5x - 3 \le x^2 + 4x + 3$? What about $x = 5$? Show how you know. Then find three more solutions.

4-53. Solve each equation below algebraically. Think about Rewriting, Looking Inside, or Undoing to simplify the process.

a. $5 - 3(\frac{1}{2}x + 2) = -7$

b. $\frac{5(\sqrt{x-2}+1)}{5} = \frac{15}{5}$

c. $12 - (\frac{2x}{3} + x) = 2$

d. $-3(2x+1)^3 = -192$

$\sqrt{x-2} + 1 = 3$
$-1 \quad -1$
$\sqrt{x-2} = 2$
$x - 2 = 4$
$x = 6$

4-54. Given the parabola $y = x^2 - 8x + 10$, complete parts (a) through (c) below.

a. Find the vertex by averaging the x-intercepts.

b. Find the vertex by completing the square.

c. Find the vertex of $y = x^2 - 3x$ using your method of choice.

a) can't be factored, so use quadratic formula

$$x = \frac{8 \pm \sqrt{64 - 4(1)(10)}}{2}$$

$$x = \frac{8}{2} \pm \frac{\sqrt{24}}{2}$$

$$x = 4 \pm \frac{\sqrt{4 \cdot 6}}{2}$$

$$x = 4 \pm \frac{2\sqrt{6}}{2}$$

Average: $x = \frac{4 + \sqrt{6} + 4 - \sqrt{6}}{2}$

vertex

$x =$

c) $0 = x(x-3)$

$x = 0, 3$

avg. x-int: $x = \frac{0+3}{2} = \frac{3}{2}$

$y = \left(\frac{3}{2}\right)^2 - \frac{3}{1}\left(\frac{3}{2}\right)$

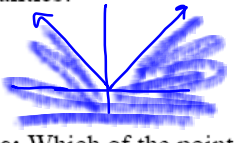
$y = \frac{9}{4} - \frac{9}{2} \cdot \frac{2}{2}$

$\left(\frac{3}{2}, -\frac{18}{4}\right)$

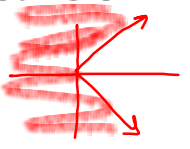
go over:

4-55. Refer back to the graphs you made for problem 4-34. (It was a homework problem from Lesson 4.1.2.) Use those graphs to help you graph each of the following inequalities.

a. $y \leq |x|$



b. $|y| \geq x$



4-56. **Multiple Choice:** Which of the points below is a solution to $y < |x - 3|$?

a. $(2, 1)$ b. $(-4, 5)$ c. $(-2, 8)$ d. $(0, 3)$

go over:

4-57. For the equation $y = -(x+1)^3 + 2$:

a. Draw a graph.

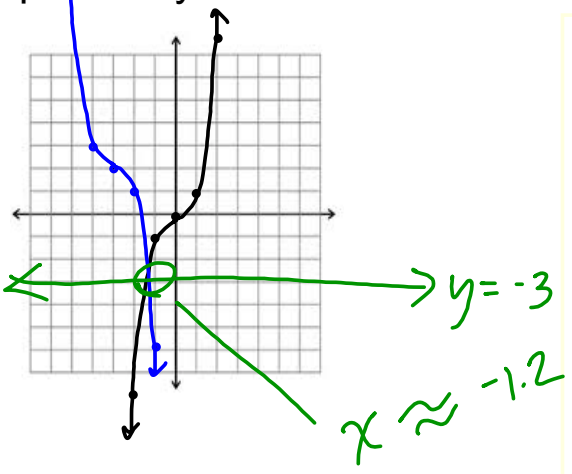
b. Use your graph to estimate the solution to $-3 = -(x+1)^3 + 2$.

graph $y = -3$

parent: $y = x^3$

transformations:

left 3
up 2
reflect over x-axis



CP's: 4- #58 ---> 63 (graph paper and white resource pg. 4.2.1A & B)

4.2.1 How can I solve inequalities?

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Solving Inequalities with One or Two Variables

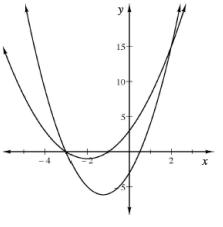
In this chapter, you developed many strategies for solving equations with one variable and systems of equations with two variables. But what if you want to solve an inequality or system of inequalities instead? Today you will explore how to use familiar strategies to find solutions for an inequality. As you work, the questions below can help focus team discussions:

What strategy should we use?

How do we know if this solution is correct?

How can we be sure we have found all of the solutions?

4-58. In the previous section, you learned how to use the graph of a system to solve an equation. How can the graphs of $y = 2x^2 + 5x - 3$ and $y = x^2 + 4x + 3$ (shown at right) help you solve an *inequality*? Consider this as you answer the questions below.



a. How are the solutions of $2x^2 + 5x - 3 = x^2 + 4x + 3$ represented on this graph? What are the solutions?

b. Obtain a Lesson 4.2.1A Resource Page from your teacher. On the resource page, label each graph with its equation and highlight each function with a different color. How did you decide which graph matches which function?

c. On the graph, identify the x-values for which $2x^2 + 5x - 3 \le x^2 + 4x + 3$. How did you locate the solutions? How many solutions are there? Find a way to describe all of the solutions.

d. How can these solutions be represented on a number line? Locate the number line labeled with $2x^2 + 5x - 3 \le x^2 + 4x + 3$ below the graph on your resource page. Use a colored marker to highlight the solutions to the inequality on the number line.

e. What about the inequality $2x^2 + 5x - 3 > x^2 + 4x + 3$? What are the solutions to this inequality? Represent your solutions algebraically and on a number line.

4-59. Consider the inequality $4|x+1|-2>6$.

a. How many boundary points are there? Remember that, in this case, a **boundary point** would be the smallest number that will make the inequality *not* true. What are the boundary points? Should they be marked with filled or unfilled circles? Make the appropriate markings on a number line.

b. Which portion(s) of the number line contain the solutions for this inequality? How many regions do you need to test? Represent the solutions algebraically and on a number line.

4-60. Burt and Ernie were solving the inequality $2x^2+5x-3<x^2+4x+3$. They were looking at the graph in problem 4-58 when Burt had an idea. *"Can't we change this into one parabola and solve our inequality that way?"* he said.

Ernie asked, *"What do you mean?"*

"Can't we find the solutions by looking at the graph of $f(x)=x^2+x-6$*?"* Burt replied.

a. Where did Burt get the equation $y=x^2+x-6$?

b. Try Burt's idea. Graph the parabola and show how it can be used to solve the original inequality.

c. *"Just a minute!"* mumbled Ernie, *"I think I have a short cut. Instead of graphing the parabola, can't we just rewrite the original inequality as* $x^2+x-6<0$ *and then solve the equation* $x^2+x-6=0$*? This would give us the boundary points and then we could test numbers to find the regions that contain the solutions."* Check Ernie's short cut. Does it give the same solution?

d. Use any method to solve the inequality $x^2-3x-10\geq 0$.

4-61. Next, Burt and Ernie were working on solving the inequality $4|x+1|-2>6$ from problem 4-59. This time, Ernie had an idea. *"Why don't we find the solutions to this by graphing a system of equations like we did in problem 4-58?"*

a. What system of equations should they graph?

b. Graph the system and explain how you can use it to find the solutions to $4|x+1|-2>6$.

4-62. In problem 4-58 you looked at solutions to an inequality with one variable (x). Now consider the system of inequalities with two variables (x and y) below.

$$y \geq 2x^2+5x-3$$
$$y < x^2+4x+3$$

a. Which points make both inequalities true? For example, does the point $(-3,0)$ make both inequalities true? What about $(-1,1)$? $(1,5)$? Refer back to your Lesson 4.2.1A Resource Page to help you think about these questions.

b. What is the difference between a solution to the *system* of inequalities above and a solution to the inequality found in problem 4-58?

c. How are the graphs of the equations $y=2x^2+5x-3$ and $y=x^2+4x+3$ related to the graph of the system of inequalities?

d. With your team, find a way to represent all of the solutions to the system of inequalities on the Lesson 4.2.1A Resource Page graph.

HW: 4-

65 ---> 71

Quiz #8 (Wednesday):

* Add & Subtract Rational Expressions
* Factor Completely
* Finding an intersection of 2 graphs on the graphing calculator